

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Calculus: Review for Q2 Exam 2

Mr. Callahan

This review sheet is not comprehensive. Be sure to study your old tests, notes, and homework as well!

1. Use Implicit Differentiation to find the derivative of each of the following:

a.  $x^2 - y^2 = 2xy$

c.  $\frac{1}{y} + \frac{1}{x} = 2$

b.  $x^3 + xy + y^3 = 4$

d.  $3x^4 = (2xy - 1)^3$

2. Find  $\frac{dy}{dx}$  at the indicated point, and then find the equation of the tangent line.

a.  $y^2 = \frac{x^2 - 4}{x^2 + 4}$  at  $(2,0)$

b.  $(x + y)^3 = x^3 + y^3$  at  $(-1,1)$

3. Determine the point(s) at which the graph of  $y^4 = y^2 - x^2$  has either a vertical or horizontal tangent.

4. For each of the following, find all points of absolute minima and maxima on the given closed interval

a.  $y = x^4 - 3x^2 + 4$ ;  $[-1,1]$

b.  $y = x^3 + 6x^2 + 9x + 3$ ;  $[-4,0]$

5. For each of the following, find (a) the intervals on which the function is increasing and (b) the intervals on which the function is decreasing:

a.  $y = x^4 - 10x^2 + 9$

b.  $y = \frac{-x}{x^2 + 4}$